Exhibit C

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Prehydrolysis of beechwood

Highly purified dissolving pulp produced by sulphur-free pulping

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Summary. The kinetics of the isothermal prehydrolysis of beechwood at 160 °C and 170 °C were investigated. It was shown that the hydrolysis of the hemicellulose portion was realized in two phases. The depth and rate of the first rapid prehydrolysis phase and the second slow phase depend on the temperature used. The lignin content in the prehydrolysed chips increased with the dissolution of the prehydrolysis due to the easily removable hemicellulose portion. The maximum amount of lignin extracted was gained after 45–60 minutes of isothermal prehydrolysis at 160 °C with the yield decrease to 82–80 per cent and at 170 °C with the yield decrease to 79–68 per cent. At the temperature of 160 °C the amount of the lignin portion extracted was about 5 per cent and at 170 °C at about 10 per cent of the whole lignin content in wood. The extraction of the whole hemicellulose portion present in wood was attained at 160 °C after 5 hours prehydrolysis time, at 170 °C after 80 minutes.

By the prehydrolysis of hardwood to 30 per cent loss of the wood substance highly purified dissolving pulp was prepared by AQ catalysed sodium pulping. The pulp attained was characterized by a high alpha-cellulose content over 97 per cent and a low solubility in solutions of alkali. The sulphur-free delignification together with the low consumption of active chlorine (3.5–4.7 per cent) causes less environmental pollution.

Introduction

The production of special grade cellulose fibres by the viscose process, as, for example, polynosic fibres, high-wet-modulus (HWM) fibres, supercord fibres, needs the production of high grade, highly purified pulps. The pulps destinated for the production of such grades of viscose fibres should have characteristics approaching the characteristics of cotton or cotton linters. Amongst the characteristics mainly a high alpha-cellulose content, a low solubility in solutions of diluted alkali and an appropriate viscosity value, characterizing the purity of these pulp grades, are involved. High purity can be attained by deep cooking in concentrated cold NaOH solutions. This high degree of purity may be achieved also during pulp processing. Post purification of the pulp may be attained, for example, by a double mercerisation in 17.5 per cent NaOH solution with an intermediate preripening of the alkalicellulose gained, as it is made in the SINI process (Sihtola 1976). Obviously, in this process the purification of the pulp is combined with the formation of alkalicellulose as an intermediate of the production of cellulose xanthogenate.